We claim:

1. A polarization conversion system comprising:

a polarizing beam splitter configured to couple light having a first polarization state to a first region and to couple light having a second polarization state to a second region;

a patterned optical retarder having a first portion of retarder material optically coupled to the first region and a second portion of retarder material optically coupled to the second region, the first portion of the patterned optical retarder providing a first polarization rotation to the light of the first polarization state and the second portion of the patterned optical retarder providing a second polarization rotation to the light of the second polarization state.

2. The polarization conversion system of claim 1 wherein the first polarization rotation is zero degrees and the second rotation is 90 degrees.

3. The polarization conversion system of claim 1 wherein the first polarization rotation is 90 degrees and the second rotation is zero degrees.

4. The polarization conversion system of claim 1 wherein light having the second polarization state obtains the first polarization state when rotated by the second portion of the retarder material.

5. The polarization conversion system of claim 1 wherein the patterned optical retarder includes a photochemically oriented base layer and a layer of photo-crosslinked liquid crystal molecules.

6. The polarization conversion system of claim 1 wherein the polarizing beam splitter comprises a first half-cell that transmits light of the first polarization state to the first region and reflects light of the second polarization state to a second half-cell, the second half cell reflecting the light of the second polarization state to the second region.

7. The polarization conversion system of claim 1 wherein the patterned optical retarder is disposed on the polarizing beam splitter.

8. The polarization conversion system of claim 1 wherein the patterned optical retarder is self-aligned to the polarizing beam splitter.

9. The polarization conversion system of claim 1 wherein the patterned optical retarder is patterned according to a lenslet array.

10. The polarization conversion system of claim 1 wherein the patterned optical retarder is patterned according to an image grid from a light pipe.

11. A polarization conversion system comprising:

a polarizing beam splitter configured to couple light having a first polarization state to a first image and to couple light having a second polarization state to a second image;

a patterned optical retarder including a photochemically oriented base layer and a layer of photo-crosslinked birefringent liquid crystal polymer, the patterned optical retarder having a first portion providing a first net polarization of zero degrees optically coupled to the first image and a second portion providing a second net polarization rotation of ninety degrees optically coupled to the second image.

12. The polarization conversion system of claim 11 wherein the polarizing beam splitter is a polarizing beam splitter panel, and further comprising:

a lenslet array optically coupled to the polarizing beam splitter panel.

13. The polarization conversion system of claim 12 wherein the lenslet array is an array of square lenses.

14. The polarization conversion system of claim 11 further comprising:

a light pipe configured to receive light from a light source, the light pipe providing an image array of the light source to the polarizing beam splitter, wherein the patterned optical retarder is patterned according to the image array.

15. A method of fabricating a patterned retarder plate, the method comprising steps of:

applying a layer of a base material to a polarizing beam splitter ("PBS");

orienting a first portion of the layer of base material to a first polarization direction, the first polarization direction being essentially parallel to a polarization of light from a first half-cell of the PBS;

orienting a second portion of the layer of base material to a second polarization direction, the second polarization direction being rotated forty-five degrees from the first polarization direction;

applying a layer of birefringent polymer material on the layer of base material, the layer of birefringent polymer material having a thickness selected to achieve, after polymerization, a half-wave retardation for visible light that is polarized at forty-five degrees from the first polarization direction; and

polymerizing the layer of birefringent polymer material to align with the first polarization direction of the first portion of the layer of base material and to align with the second polarization direction of the second portion of the layer of base material.

16. The method of claim 15 wherein the birefringent polymer material comprises liquid-crystal polymer material.

17. The method of claim 15 wherein the layer of birefringent polymer material is polymerized by exposure to isotropic light.

18. The method of claim 15 wherein the base material is photo-chemically orientable and the step of orienting the first portion of the layer of base material includes masking a second portion of the base material with a photomask and illuminating a first portion of the base material to first linearly polarized light parallel to the polarization of a first image of the PBS.

19. The method of claim 18 wherein the step of orienting the second portion of the layer of base material includes removing the photomask and illuminating the first portion of the base layer material and the second portion of the base layer material with second linearly polarized light having a polarization direction rotated forty-five degrees from the first linearly polarized light.

20. The method of claim 15 wherein the step of orienting the first portion of the layer of base material comprises illuminating the first portion of the layer of base material through the PBS with first linearly polarized light, and the step of orienting the second portion of the layer of base material comprises illuminating the layer of base material with second linearly polarized light having a second polarization orientation rotated forty-five degrees from the first polarization orientation.

21. The method of claim 20 wherein the step of orienting the second portion of the layer of base material comprises illuminating the layer of base material from a side opposite the PBS.

22. A patterned retarder plate manufactured according to the method of claim 15.

23. A method of fabricating a patterned retarder plate, the method comprising steps of:

applying a layer of a photo-definable retarder material to a surface of a polarizing beam splitter ("PBS");

illuminating the PBS with first linearly polarized light having a first polarization orientation parallel to a polarization orientation of an image from the PBS to orient a first portion of the photo-definable retarder material to the first polarization orientation;

fixing the orientation of the first portion of the photo-definable retarder material;

illuminating the layer of photo-definable retarder material with second linearly polarized light having a second polarization orientation rotated forty-five degrees from the first polarization orientation to orient a second portion of the photo-definable retarder material to the second polarization orientation; and

fixing the orientation of the second portion of the photo-definable retarder material.

24. The method of claim 23 wherein the step of fixing the orientation of the first portion of the photo-definable retarder material is concurrent with the step of illuminating the PBS and the step of fixing the orientation of the second portion of the photo-definable retarder material is concurrent with the step of illuminating the layer of photo-definable material.

25. The method of claim 23 wherein the layer of photo-definable retarder material comprises a layer of birefringent polymer material disposed on a layer of photochemically orientable base material.